TIMES SUPPLEMENT.

BUTLER, MISSOURI. WEDNESDAY, SEPTEMBER 14, 1892

MONTHLY BULLETIN

OF THE

Missouri State Board of Agriculture,

FOR SEPTEMBER 5, 1892.

LEVI CHUBBUCK, Secretary, Columbia, Mo.

SUMMARY OF RETURNS.	State	Northeast	Northwest	Southeast	Southwest	Central
Corn, average condition September 1	82	77	88	86	73	86
Wheat, average condition when harvested	86	73	83	95	92	86
Rye, average condition when harvested	85	79	84	93	84	88
Oats, average condition when harvested	65	56	56	63	78	69
Buckwheat, average condition September 1	87	91	94	82	82	82
Potatoes, Irish, average condition September 1	63	48	53	80	63	65
Potatoes, Sweet, average condition September 1	82	77	81	92	81	77
Tobacco, average condition September 1	88	86	87	96	82	90
Cotton, average condition September 1	76	.....	.....	75	77	.....
Sorghum, average condition September 1	86	84	85	89	83	85
Apples, average condition September 1	40	35	25	49	47	40
Peaches, average condition September 1	31	41	09	39	18	30
Grapes, average condition September 1	75	72	82	77	72	72
Stock-hogs, number for fattening compared with last year	85	83	79	90	86	86
Stock-hogs, average condition as to weight and size	90	88	85	93	91	93
Clover seed, acreage compared with last year	94	89	91	103	96	92
Clover seed, condition of the crop September 1	89	85	94	91	86	87

On the first of August the estimated percentage condition of *Corn* was higher in Missouri than in any of the seven great corn-producing States and required only continued favorable conditions to make an average crop. The favorable conditions did not continue, however, and the consequent drop in the estimated percentage condition is due, in a measure at least, to the depressed spirits of the farmers, and a greater loss is estimated, probably, than will be found to have occurred.

The drouth and heat of August were relieved only by local showers, badly distributed, although in many places the corn has not suffered for moisture, and reports made since the good general rain of the 27th ult. are much more cheerful. With good seasonable weather a much higher percentage condition will be justified a month hence.

The condition of corn at this date in 1891 was but 85 per cent., but, of course, there is greater reason to fear damage from frost this season owing to the late planting. Many correspondents say the late corn will not be safe from frost until October 1.

Wheat varied in yield, some threshing returns not nearly equaling anticipation, while in the southern and southwest counties the yield was above earlier estimates. Some of the grain is bleached and shriveled, but it is generally of good quality, and the crop as a whole equals the estimates made from this office early in the season.

The later and fuller the returns the worse appears the oat crop.

Buckwheat continues to do well.

Irish potatoes are very poor, some counties in North Missouri reporting the "nearest a failure in thirty years."

Sweet potatoes continue in better condition than the Irish, but do not promise so good a crop as last year.

The month was quite favorable for the tobacco crop, which is in good condition.

Cotton and sorghum continue to improve.

There is no improvement in the fruit prospect; apples and peaches continue to decline, and grapes do not equal the condition popularly credited to them, and from carefully compiled returns will not exceed for the State three-fourths of a full average yield.

The long, cold, wet spring combined with little feed and want of care caused great loss of young pigs, so stock-hogs are scarce; many counties reporting, "no surplus, all needed for home consumption." There is no disease reported, and the condition of hogs is comparatively good.

The acreage of clover seed is below that of last year and the seed has been much damaged, in localities, by the native red-legged grasshopper.

FERTILIZING WHEAT LAND.

LAMONTE, MO., August 29, 1892.

Levi Chubbuck, Secretary State Board of Agriculture, Columbia, Mo.

DEAR SIR:—I wish to use commercial fertilizer on forty acres of land for wheat this fall, this land has had two crops of wheat on it in succession. The crop last year yielded about 18 bushels and this year about 14 bushels per acre. Would like you to inform me the best fertilizer for wheat. When and how to apply it. How much per acre and the probable cost per acre, and also if you think it a profitable investment.

An early reply will greatly oblige, yours very truly,

R. E. GUTHRIE.

The information called for by the foregoing letter is of much moment to the wheat-raising farmers of Missouri, but a full and satisfactory answer would require almost a book on the subject of fertilizers.

Answering the last question first, it is, generally speaking, questionable if the use of commercial fertilizers in wheat growing will pay in Missouri with wheat at present prices. Neither will it pay to raise wheat for the prices now obtained, and at the present average rate of yield. There must be larger crops per acre obtained by methods which will not involve a very considerable increase in cost of production per acre.

On certain soils and under certain conditions it is quite possible to use commercial fertilizers on wheat land with profit, but to say that it will pay on this field or on that farm is beyond the power of anyone except by investigation.

Fertilizers, whether so-called commercial, or in the form of barnyard manure or a green crop plowed under, are simply plant food added to that of the soil. Plants use as food a number of different substances, about 14 in all, some of which are supplied more freely by nature than others. A fertile soil is one that contains an abundance of such of these elements as must be obtained from that source, and in such a condition as to meet the needs of the plants growing thereon. If a single element of plant food essential to the growth of a plant is absent from a soil, that soil is unfertile so far as that plant or any other kind of plants needing that same element is concerned. If a soil has a limited supply of one or more of food elements in an available form the growth of the crop will be limited to the same extent. A soil may, and often does, have an abundance of all the food elements except one or two. In such cases, it is of course only necessary to supply the deficiency. This is a vital point in land fertilization especially when commercial fertilizers are used, for the prices fixed by dealers are based on the market value of each element of plant food contained in the brand they are selling.

Realizing that plant food is made up of 14 elements in different combinations, that these are required by plants and exist in the soils in varying proportions, the problem of fertilization would seem to be a most complicated and difficult one. But if we get possession of the right facts to start with it will not be nearly so hard to solve. To the facts already stated we will add another, namely, that of the 14 elements constituting plant food all but three of them are, as a very general thing, supplied in abundance by nature; consequently, we need only consider the three that may be lacking and take steps to supply them. These are nitrogen, phosphoric acid and potash. A soil may be deficient in whole or in part in one or more of these three. It may have an abundance of all for one kind of crop, and not enough to meet the different requirements of a different kind. The elements may all be there in sufficient quantity, but in an insoluble condition or chemicel combination, so that the plants can't make use of them until the processes of nature shall make them available, or they may be there in the right condition, but not in just the right place to be reached by the plant roots, that is, they may be too far down to be reached by shallow-rooting plants.

Hence, when the question is asked specifically as to what fertilizer this or that field needs to make it produce certain crops, there must be a good deal of contingent information at hand to enable one to answer. One does not want to buy a complete fertilizer, that is, one containing all three of the elements named, and thus pay out money for ingredients his land has no lack of; neither does he want to buy a special fertilizer, that is, one containing only one of the elements, unless he knows that that is just what his land and crop wants. Chemistry will not give the information so far as the land goes with sufficient accuracy. Nature is much more delicate in her processes, and if we ask her the questions properly she will tell us.

If the farmer who is not raising enough wheat to the acre to satisfy him and wants to know what to do to increase the yield will take an average acre of his wheat land, plow and prepare uniformly, sow to wheat, divide into 10 equal plats, and upon these put different kinds of fertilizers, commercial and homemade, leaving one or two of the plats unfertilized, nature will answer his inquiry in the results more satisfactorily than it can be in any other way. Leaving two of the plots unfertilized, on one of the others there might be put 32 pounds of dissolved bone black which would supply phosphoric acid at the rate of 50 pounds to the acre. On another put 16 pounds of muriate of potash supplying potash at the rate of 80 pounds to the acre; and on a third put 16 pounds of nitrate of soda which would be at a rate of 25 pounds of nitrogen to the acre. On another one put two of the three substances named, nitrate of soda and bone black; and muriate of potash and bone black on another and nitrate of soda and muriate of potash on the next one and on one put all three ingredients. There will be one plat left on which 50 or 100 pounds of bone meal can be used. By noting the growth during the season, and by harvesting, weighing and threshing the crops separately one will be able to tell quite accurately what the soil of that farm needs for wheat production, and in practically no other way can this be specifically determined.

But unless one wants to continue a particular crop year after year on the same land it is not necessary that he know exactly what is lacking in the soil that he may avoid waste of material. If he will again look to nature and follow her plain teachings he will not follow continuous cropping, but will rotate. By so doing if a general fertilizer is used and the first crop does not require all of the plant food it contains, another crop having different requirements following next year will make use of the surplus providing it has not been lost by drainage and leaching. Hence, it is that the farmer should know something of the composition and feeding character of his crops.

TABLE.

Materials removed from the Soil by Various Crops.

	Phosphoric Acid.	Potash.	Nitrogen.
	lbs.	lbs.	lbs.
Rye.			
Grains, 25 bushels—1,400 lbs.	11.8	7.8	24.6
Straw, 3,500 lbs.	7.3	27.3	14.0
Total	19.1	35.1	38.6
Oats.			
Grain, 30 bushels—960 lbs.	6.0	4.2	18.4
Straw, 2,000 lbs.	3.8	17.8	11.2
Total	9.8	22.0	29.6
Wheat.			
Grain, 20 bushels—1,200 lbs	9.5	6.4	25.0
Straw, 3,000 lbs.	6.6	18.9	14.4
Total	16.1	25.3	39.4
Corn,			
Grain, 50 bushels—2,800 lbs.	16.5	10.4	44.8
Stalks, 6,500 lbs.	34.5	62.4	31.2
Total	51.0	72.8	76.0
Hay.			
Clover, 3,000 lbs.	16.8	54.	64.
Mixed grasses, 1½ tons—3,000 lbs.	12.3	39.6	46.5
Potatoes.			
Tubers, 150 bushels—9,000 lbs	14.4	51.3	30.6
Tobacco.			
Leaves, 1,800 lbs., (1,260 lbs. dry)	7.5	71.	49.
Stalks, 1,100 lbs. dry	15.	47.	33.
Total	22.5	118.	82.

Assuming that the land in question has just enough of each of the three essential food elements to make a crop of 10 bushels of wheat per acre, what must we add and at what cost to make 30 bushels? By the table, we see that 20 bushels of wheat and 3,000 pounds of straw will require, omitting fractions, 16 pounds phosphoric acid, 25 pounds potash and 39 pounds nitrogen.

The first can be supplied in 100 pounds of bone black which will cost about $30 a ton, or $1.50; 50 pounds of muriate of potash will give 25 pounds of potash, costing $50 a ton, or $1.25; and 200 pounds of sulphate of ammonia will give 40 pounds of nitrogen, and will cost $80 a ton, or $8. Total cost of fertilizers required to produce the extra 20 bushels of wheat, $10.75, 20 bushels of wheat at 70 cents a bushel will be worth $14, with the straw extra. If it can be determined that there is enough of one or two of the three food elements in the soil to produce any part of the extra 20 bushels in addition to the 10 bushels, then there would be no need of supplying the full requirements for 20 bushels. Suppose, for instance, that there was enough nitrogen in the soil to produce 20 bushels of wheat and only enough of the others to produce the 10 bushels. Then there would only be $4 worth of sulphate of ammonia needed per acre in addition to the $1.50 worth of bone black and $1.25 worth of muriate of potash, reducing the cost to $6.75.

Bone meal is being used quite extensively as a wheat fertilizer. Let us examine it a little: 100 pounds of it contains 3.8 pounds of nitrogen. To supply enough for an extra yield of 20 bushels of wheat would require 1,000 pounds. This would contain, besides 2 pounds of potash, 232 pounds of phosphoric acid, when not over 16 are required to meet the needs of the increased yield of 20 bushels; 23 pounds of potash will be lacking, and there will be an excess of 216 pounds of phosphoric acid. The cost of the bone meal will be about $36 a ton, or $18 for 1,000 pounds, and if to this is added 25 pounds of muriate of potash to supply the potash, at a cost of $1.25, the cost of the fertilizer in that form will be $19.25 per acre, $5.25 more than the increased crop is worth, not counting the straw. But the 216 pounds of excess phosphoric acid has a market value of 5 cents a pound, or $10.80, which, if it is retained by the soil, as it probably will be, for succeeding crops, can be deducted from the $19 25 leaving the cost of fertilizing with bone meal and muriate of potash $8.45 per acre, and a net profit from the 20 bushels of extra crop, $6.45, not counting extra cost of threshing and handling.

Thus we can figure out a profit from the use of commercial fertilizers, and undoubtedly this can be secured under the proper conditions. But, as remarked in the outset, it is questionable if their use is to be strongly or indiscriminately advised.

What, then, are we to do to increase our wheat yield to a profitable point? is asked. Referring to the table again we see that a crop of 1½ tons of clover contains 64 pounds of nitrogen. It appears, also, that to supply 40 pounds of nitrogen, enough to make 20 bushels of wheat in the form of sulphate of ammonia, costs $8, much of the largest part of the cost when all three of the food elements must be added. Now, with the further fact in mind that the clover plant and its relatives the pea, bean, etc., have the power possessed, so far as known, by no other farm plants, of gathering this costly food element of nitrogen from natural sources (the air is four-fifths nitrogen) and fixing it in condition for use of other plants, we have the key to the problem. A 1½-ton crop of clover, to say nothing of the roots, contains enough nitrogen to make a 30-bushel crop of wheat. The other two food elements, potash and phosphoric acid, if they be lacking, can be supplied at a comparatively light cost

The stock-raiser may say, and with good reason, that clover is too valuable as a stock food, supplementing as it does and making valuable such foods as straw and corn fodder, to plow under as a fertilizer. If it is fed and the manure made by the stock is carefully saved, nearly as much plant food will be secured in addition to the stock-feeding value.

So we say invest cautiously in commercial fertilizers, but don't be afraid of clover, it makes cheap animal and plant food.

AGRICULTURAL PHOTOGRAPHS WANTED BY THE MISSOURI WORLD'S FAIR COMMISSIONERS.

Levi Chubbuck, Secretary State Board of Agriculture, Columbia, Mo.

DEAR SIR:—Knowing the readers of the BULLETIN to be deeply interested in the agricultural exhibit of the State of Missouri at the World's Fair, I beg to submit the following information:

Space approximating 3,240 square feet has been assigned the State in the agricultural building. It is eminently satisfactory as to location, and is greater in area than that assigned to any other state. In this space the collective agricultural exhibit of the State is to be made. This exhibit will be composed of the contributions of numerous individuals throughout the State.

The principal reason for writing this communication is to reiterate the invitation to all agricultural people in Missouri to contribute the choicest products of their several farms to the Missouri World's Fair exhibit, assuring them that they will get full personal credit for same by having their names, and the county and locality where they live plainly labeled thereon.

Within the limits of the space at our command we can only show by photographs the methods of planting, cultivation and harvesting. Are there not some of your readers who have pride enough to have a photograph of a typical field of corn, cotton, castor beans or other products taken for this purpose. Let it be remembered that it will be plainly stamped with the name of the owner, and the location, and at the close of the exposition the picture will be returned to the owner. How about our fruit and stock men? Are there any among them who wish to avail themselves of this opportunity of getting before the world? The autumn seeding season is now hard upon us, and if there are any among your readers who would like to have a photograph of any particular scene occurring on their plantations during the fall seeding, we will take pleasure in giving due prominence to same.

Farms and farm administration and management are features to be illustrated by drawings. Have you not among the readers of the BULLETIN some proud possessor of a model farm who would be glad to show it to the world by this graphic method? If so, the Missouri World's Fair Commission will take great pleasure in making nice provision for exhibiting it. I hope our leading agriculturists may think seriously and favorably of this matter.

The photographs I have referred to should be about 18x24 inches in size. This is larger than the ordinary camera will take, but small negatives may be made and sent to competent parties for enlargement.

In conclusion we desire to especially solicit contributions of choice specimens of cotton and broom corn. Any of your readers having fine specimens of either of these will confer a favor by corresponding with the undersigned.

J. K. GWYNN,

Executive Commissioner, Room 207, Mermod & Jaccard Building, St. Louis, Mo.

REQUESTS FOR FARMERS' INSTITUTES.

Requests for farmers' institutes have been received by the Board of Agriculture from farmers in the following named counties:

Audrain,	Gentry,	Pettis,
Barry,	Greene,	Perry,
Boone,	Grundy,	Polk,
Butler,	Henry,	Pulaski,
Cass,	Howard,	Putnam,
Camden,	Howell,	Ralls,
Chariton,	Jackson,	Saline,
Clinton,	Jasper,	Stoddard,
Cole,	LaFayette,	Shelby,
Cooper,	Maries,	Sullivan,
Dallas,	Macon,	Stone,
Daviess,	Monroe,	Texas,
Franklin,	Oregon,	Vernon.

Fifteen or twenty more counties can be included in the series if invitations are received soon. Communities wishing meetings will confer a favor by writing at once to the Secretary, as arrangements for the series must be completed very soon. The expenses of the meeting, except for hall, are met from funds provided by the State. The meetings will continue two days in a place. Speakers qualified to discuss any of the practical farm topics will be in attendance.

THE ROADS IMPROVEMENT CONVENTION.

HELD AUGUST 16–19, IN CHILLICOTHE, MISSOURI.

If anyone doubted that the people of Missouri were in earnest regarding the necessity of road improvement, he would have had his doubts speedily dispelled had he attended the Roads Improvement Convention held August 16–19, in Chillicothe, Mo. It is a question if there was ever a convention held in the State where those present were more thoroughly imbued with the importance of the purpose for which they were assembled, or more determined that that purpose should be accomplished.

The convention was made up of men representing the best thought and character in the State, a body to whom it would be safe to entrust any question of public policy, and an honor to anyone to be able to say he was one of the number and took part in the deliberations.

That this convention carried the road improvement cause a long stride forward, is not questioned.

During the winter of 1890–91 the Missouri State Board of Agriculture inaugurated the first systematic movement in favor of good roads by having the subject discussed in all of the series of farmers' institutes held that season. In September of 1891, the Board held the great trial of road machines at Mexico, Mo., the first of the kind ever held on so large a scale. This attracted wide-spread attention, and the great interest awakened was the first manifestation that the people were becoming aroused to the importance of good roads. Discussion of the subject was continued at the meetings held by the Board during the winter of 1891–92, and a number of local road improvement societies were formed, the first being at Fulton, Mo., where the first institute of the season was held. J. L. Erwin was made president of the society, a fitting recognition of his years of personal effort in this cause.

On March 2, at a meeting of the Board of Agriculture, the Secretary of the Board was authorized to arrange for a State Roads Improvement Convention during the coming summer. The meeting just held at Chillicothe was the result of that action. In the meantime, during May last, the Greene County Roads Improvement Society held at Springfield, Mo., a State Roads Improvement Convention that was largely attended and of much interest. A very important result being the formation of a State Road Improvement Association.

THE CHILLICOTHE CONVENTION.

The conception of the Chillicothe Convention embodied two leading ideas:

First, the developing and dissemination of information as to the best ways and means of road building, and,

Second, to determine the prevailing sentiment of the people of the State relative to road legislation.

To accomplish the first purpose, besides papers and lectures on road building, manufacturers of road machinery were invited to exhibit their wares, and arrangements were made by which the machinery and tools were used in road construction, thus affording the delegates present, many of whom wanted to purchase road machinery, an opportunity of judging of the relative merits from the work done, besides getting many practical suggestions in the art of road-building from the experts who operate the machines.

THE MACHINERY EXHIBIT.

In response to the invitation the following-named firms had machinery, as designated, on the grounds:

Hunt & Adams, Indianapolis, Ind., the champion rock crusher, two champion road machines, a champion road roller, wheeled scrapers, slushers, road plows and a steel culvert.